APPENDIX A

A.0 WATER QUALITY REPORTS AND DATA

Table 1 presents the data used to develop the Chollas Creek Dissolved Metals TMDL.

Table 1. Chollas Creek Dissolved Metals TMDL References

Ref.	Source
a	City of San Diego and Copermittee Storm water Monitoring Program 1994-1995 (Kinnetic Laboratories)
b	City of San Diego and Copermittee NPDES Storm water Monitoring Program 1995-1996 (Woodward-Clyde)
c	City of San Diego and Copermittee NPDES Storm water Monitoring Program Report 1997-1998 (Woodward-Clyde)
d	City of San Diego and Copermittee NPDES Storm water Monitoring Program Report 1998-1999 (URS Greiner Woodward Clyde)
e	City of San Diego and Copermittee NPDES Storm water Monitoring Program Report 1999-2000 (URS Greiner Woodward Clyde)
f	City of San Diego and Copermittee NPDES Storm water Monitoring Program Report 2000-2001 (MEC Analytical Systems, Inc.)
g	Chollas Creek Watershed Monitoring Final Report 1999-2001 (MEC Analytical Systems, Inc.)
h	Chollas Creek Water Quality Sampling 1999-2000 Wet-Weather Season (URS)
i	City of San Diego and Copermittee NPDES Storm water Monitoring Program Report 1996-1997 (Woodward-Clyde International-Americas)
j	San Diego County Municipal Copermittees 2001-2002 Urban Runoff Monitoring Final Report (MEC Analytical Systems, Inc.)
k	City of San Diego and Copermittee NPDES Storm water Monitoring Program 1993-1994 (Kinnetic Laboratories, Inc.)
l	Lab Results/Quality Assurance Laboratory (4 Jun 91)
m	Lab Results/Quality Assurance Laboratory (8 Apr 92)
n	Lab Results/Quality Assurance Laboratory (9 Apr 92)
o	Characterization of Storm water Toxicity in Chollas Creek, San Diego (SCCWRP, 10 Nov 1999)
p	1998-1999 Annual Report for Storm Water Discharges Associated with Industrial Activities: Trolley Auto Parts
q	1998-1999 Annual Report for Storm Water Discharges Associated with Industrial Activities: Mini Trucks and Cars
r	1998-1999 Annual Report for Storm Water Discharges Associated with Industrial Activities: Able Auto Wrecking
s	1998-1999 Annual Report for Storm Water Discharges Associated with Industrial Activities: Allways Recycling
t	Laboratory Results, E.S. Babcock and Sons, Inc., reported 9/26/00
u	Storm water Toxicity in Chollas Creek and San Diego Bay, California. Kenneth Schiff, Steven Bay and Dario Diehl. *Environmental Monitoring and Assessment*, 2003.
v	Storm Water Monitoring and Research Program Annual Data Summary Report 1999/2000. CTSW-RT-00-031. Caltrans, January 2001.
w	2002-2003 Annual Copermittee Annual Storm water Monitoring Report - Preliminary Results

To gain a more thorough understanding of the priority water quality problem and loadings to the Chollas Creek Watershed, additional data that has been assessed since the Dissolved Metals TMDL and the Diazinon TMDL were evaluated. The following is a summary of the data that

was available for the Chollas Creek Watershed during the Initial Assessment component of the Chollas Creek Metals TMDL Implementation Plan.

A.1 Chollas Creek PRISM Grant

An Integrated Pest Management education program was developed under the Proposition 13 PRISM Grant Agreement No. 04-17-559-0 for the Chollas Creek Watershed. The Chollas Creek PRISM Grant was a three year program that was be completed in March, 2007. This program was also used to provide information to comply with Regional Board Order No. R9-2004-0277. The primary focus of this program was to induce positive changes in attitudes and behaviors of the residential and commercial sector regarding pesticide use in urbanized watersheds with the goal to protect and restore affected beneficial uses of receiving waters of the Chollas Creek Watershed.

This program collected data from two mass loading stations and two monitoring locations in the south fork of Chollas Creek during the 2004-2005 and 2005-2006 wet weather monitoring seasons and sediment samples collected during June 2005. Two of these locations were located in the south fork of Chollas Creek, which allowed for spatial analysis.

Key Findings of PRISM Grant Monitoring Program

- The first storm of the season (first flush storm event) had significantly higher concentrations for metals, total hardness, and nutrients.
- Regression analysis indicated that the total metals (cadmium, copper, lead, and zinc) showed the relationships with total suspended solids (TSS) concentrations. But, the dissolved metals fraction did not show this relationship.
- The concentration of Diazinon has been decreasing with time. It is expected that residual supply will eventually be exhausted and detections of Diazinon should continue to decrease with the USEPA ban on the manufacture and retail sale of this product.

A.2 Chollas Creek Enhancement Grant

The Chollas Creek Water Quality Protection and Habitat Enhancement project at the Youth Park site was developed under Grant Agreement No. 04-015-559-0 for the Chollas Creek Watershed. The REC-2, WARM, and WILD beneficial uses were improved by removing a portion of the concrete channel, widening, and restoring this portion of the channel to natural habitat. Native vegetation was planted in December of 2007. This provided the foundation for the restoration of the aquatic and terrestrial habitats and biological resources. Channel improvements result in reduced water velocity, which promotes the settling of suspended solids.

Data collected under this program included the pre-restoration results from two mass loading stations, ENHC(1) and PRISM-2, during monitoring activities from the 2005-2006 and 2007-2008 wet weather monitoring seasons, prior to the 02/01/08 grant project deadline. The water

quality results were inconclusive with regard to determining statistically significant improvements in water quality between the two monitoring sites. The only post-construction monitoring event on 01/05/08 occurred immediately after construction and restoration was completed, therefore the vegetation had not become established. Based on the field observations and general water quality trends, it was expected water quality will improve as the vegetation continues to become established, resulting in reduction of water velocity and retention of sediment particles in the restored area.

Key Findings of the Chollas Creek Enhancement Project

- A comparison between pre-construction and post-construction conditions may suggest metals concentrations generally decreased.
- Concentrations of Diazinon were less frequent and generally below the TMDL WLA.
- The physical habitat assessment component suggests that upon establishment and maturation of the restored vegetation, the Enhancement site will offer dramatically improved riparian habitat. Also, TSS and those pollutants associated with TSS (e.g. metals and pesticides) were also likely to decrease.

A.3 Regional Board Active Industrial Storm Water Permittees (Chollas Creek Watershed) Analytical Report File Review

A file review was performed at the Regional Board for the existing permitted facilities required to submit metals data based on their Standard Industrial Classification Code. Only nine businesses with current and active industrial storm water permits were identified as being required to submit analytical data for the Chollas Creek Watershed (Figure 1). Seven of the nine businesses had data files available for review, including:

- Advanced Metal Forming
- Pacific Coast Recycling
- EDCO Disposal Corp.
- IMS Recycling Main Yard
- IMS Recycling Boston Yard
- San Diego Galvanizing
- Southern California Plating Co.

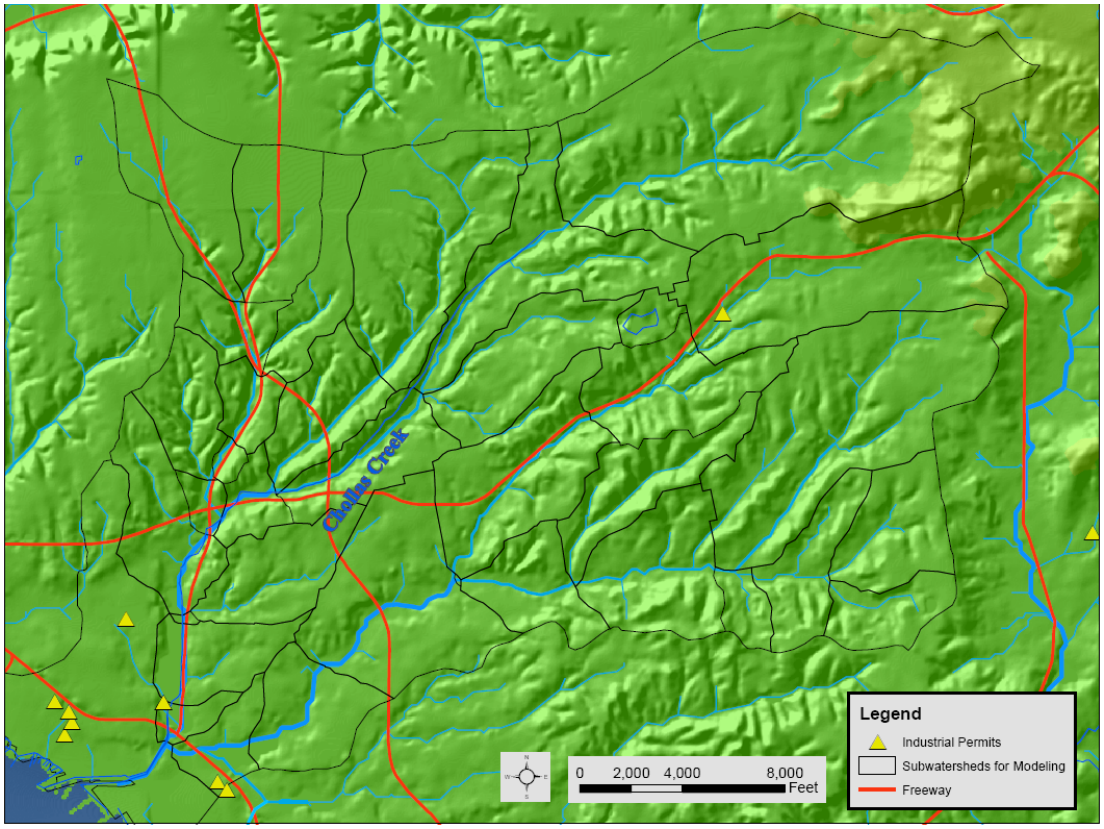

Figure 1. Locations of Industrial Permit Holders with Storm Water Sampling Data

Only one of the nine facilities was located in the upper watershed (within the jurisdiction of the City of Lemon Grove). That facility did not report metals results. Four of the reporting facilities submitted metals data, but there was no consistency between the results. None of these data reports included results for hardness so no geospatial comparison could be made to the California Toxics Rule (CTR) water quality objectives.

A.4 Chollas and Paleta Creek Watershed Monitoring Project – San Diego Coastkeeper Progress Report (04/15/03-12/31/05)

The Chollas and Paleta Creek Watershed Monitoring Project was implemented to encourage citizen participation and provide reliable data that would support on-going TMDL efforts as well as assist in the determination of the necessary pollution prevention measures to be implemented in the Chollas and Paleta Creek watersheds. The San Diego Coastkeeper (formerly Baykeeper) worked closely with its grant partners and regional stakeholders to: conduct outreach and education and produce and distribute thousands of copies of bilingual (English and Spanish) watershed pollution prevention educational materials, trained nearly 100 volunteers, and conducted 12 monthly citizen watershed, and five storm monitoring events. Coastkeeper also worked with its project partner Southwestern College to successfully develop local capacity to analyze water samples for Diazinon.

Monitoring results from six locations in the Chollas Creek Watershed were reported for metals, Diazinon, and other priority water quality problems. However, the results were reported as averages and did not provide hardness results for comparison to the CTR standards.

A.5 San Diego County Municipal Copermittees Urban Runoff Monitoring Program (2007-2008)

The *San Diego County Municipal Copermittees 2007-2008 Urban Runoff Monitoring Report* includes results and analyses of chemistry, bacterial, and toxicity data collected during two ambient weather monitoring events, two storm monitoring events, historical data at the mass loading stations, jurisdictional dry weather data collected during the Copermittees' 2007 Dry Weather Monitoring Program, Coastal Storm Drain Monitoring Program data collected at coastal outfalls, and available and relevant third-party data. Additional information not found in this summary appendix, may be found in that report (hereinafter referred to as the San Diego Copermittee Monitoring Program or San Diego Copermittee Monitoring Report).

A.5.1 San Diego County Municipal Copermittees Dry Weather Monitoring Program (2003-2008 Dry Weather Monitoring Results)

Under Regional Board Order 2001-01, the County of San Diego, the Port of San Diego, and the Cities of San Diego, Lemon Grove, and La Mesa perform dry weather monitoring to detect and eliminate illicit discharges and illegal connections to the MS4 during the dry weather period (defined as May 1st through September 30th) each year. Data results are submitted annually in a spreadsheet format from each Copermittee for their jurisdiction to the County of San Diego. These data are compiled and the dry weather results from samples collected in the receiving water are used in the assessment of the watershed (diamond rating system presented in the San Diego Copermittee Monitoring Report and in Table A-1 in Tool A of Appendix D).

A.5.2 Ambient Monitoring

Historically, the County of San Diego Dry Weather Monitoring Program for the MS4 has not identified exceedances for CTR metals, as shown in Figure 2. The 2007-2008 reporting season was the first year that ambient, dry weather water quality was monitored at SD8(1), the mass loading station in the northern drainage area of the Chollas Creek Watershed. Figure 3 shows the ratio of the water quality results to the ambient water quality benchmark. Sample results are compared to the benchmarks that are provided in Appendix D of the 2007-2008 San Diego Copermittee Monitoring Report and are based on published values. Dissolved copper was the only dissolved metal above the hardness-based CTR acute criteria during both the March 2008 and June 2008 ambient monitoring events (Chollas Creek TMDL Monitoring Study, Appendix D). During this monitoring year, metals concentrations at the upper watershed sampling locations LM-1 and LG-1 were similar to concentrations at the lower watershed sampling locations SD8(1) and DPR2. At LM-1, dissolved copper concentrations were below the acute water quality objective. No metals concentrations were above the acute water quality objective at LG-1 during either dry weather sampling event (see Section 1.5.4, Chollas Creek TMDL Monitoring Study). A trend analysis cannot be completed for these sampling locations at this time due to the limited data currently available.

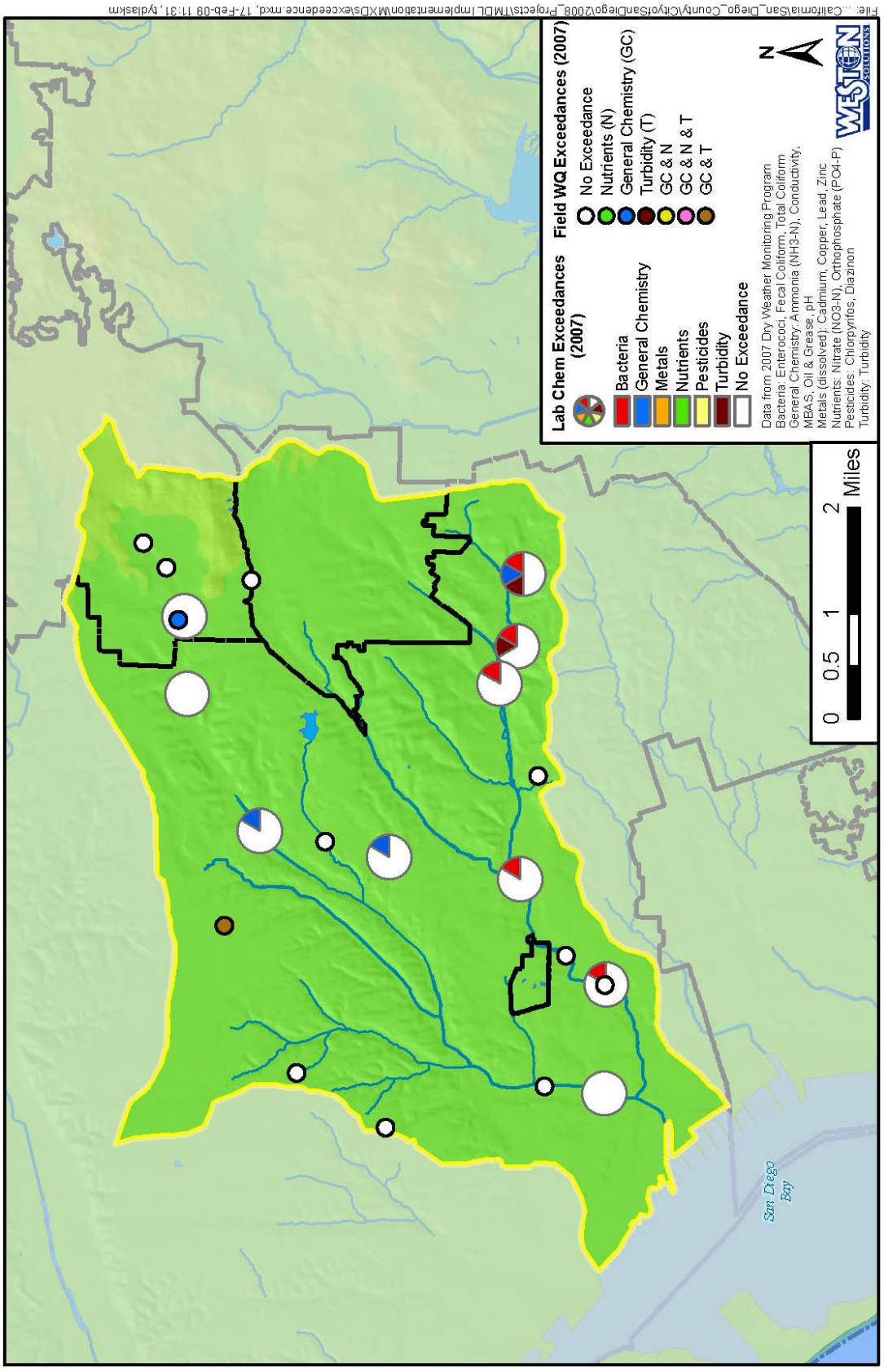

Figure 2. Map of Exceedances of the Dry Weather Action Levels for the 2008 Dry Weather Monitoring Period

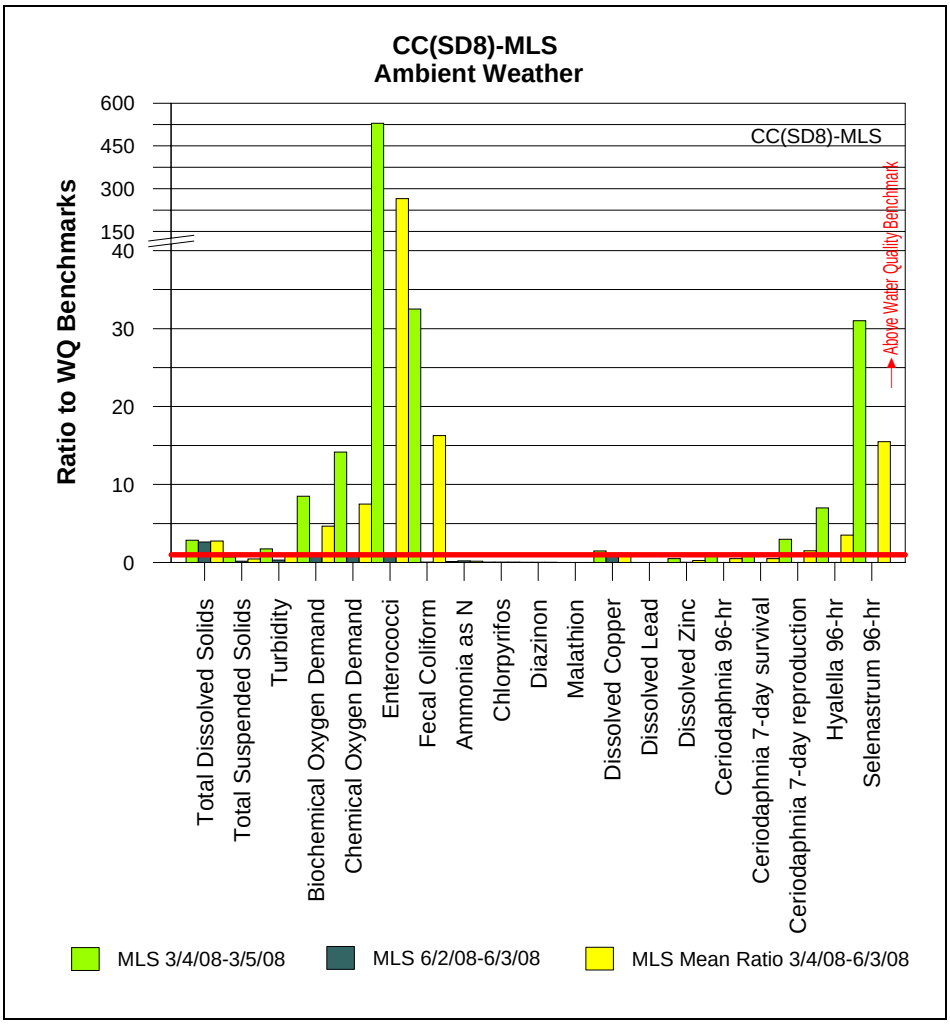

Figure 3. Chollas Creek Ambient Water Quality Ratios

Key Current (2007-2008) Ambient Results

- All total and dissolved metal concentrations, except for dissolved copper at SD8(1), were below the water quality benchmarks.
- Pesticides were below the benchmarks.
- Exceedance of the benchmarks were observed for bacteria indicators and toxicity during the March 2008 monitoring event but not the June 2008 monitoring event.

A.5.3 Wet Weather Monitoring

Regional Board Order No. R9-2004-0277 requires three storms to be monitored for dissolved metals (copper, lead, and zinc), Diazinon, and toxicity in the Chollas Creek Watershed at SD8(1) (northern drainage area) and DPR2 (southern drainage area) each year. Annual storm water

monitoring has been performed at the SD8(1) MLS in the Chollas Creek Watershed since the 1993–1994 wet weather monitoring season.

At the SD8(1) MLS in the Chollas Creek Watershed, dissolved copper, lead, and zinc have been historically above benchmark values 49%, 26%, and 74% of the time, respectively. The first storms of the season have also had historically higher fecal coliform results compared with later storms monitored over the past three monitoring seasons.

During the 2007-2008 monitoring season, monitoring occurred on November 30, 2007, December 7, 2007, and February 3, 2008. Figure 4 shows the ratio of the concentration detected in water quality samples to the concentration defined by the wet weather water quality benchmark for site SD8(1). The benchmark represents the objectives stated in the Basin Plan and have not been adjusted for the margin of safety used in the TMDLs. During the 2007-2008 monitoring season, dissolved copper was detected above the benchmark values at SD8(1) and DPR2. Dissolved zinc was detected above the benchmark at SD8(1). Dissolved lead was below the benchmark values at both SD8(1) and DPR2. Fecal coliform results were above the water quality benchmark at both sites. Fecal coliform concentrations were higher during the first flush storm event in November than during the second and third monitored storms. Additional water quality data and analysis for metals and bacteria may be found in the *2007–2008 Water Quality Monitoring Data Summary for Chollas Creek* and the 2007-2008 San Diego Copermittee Monitoring Report.

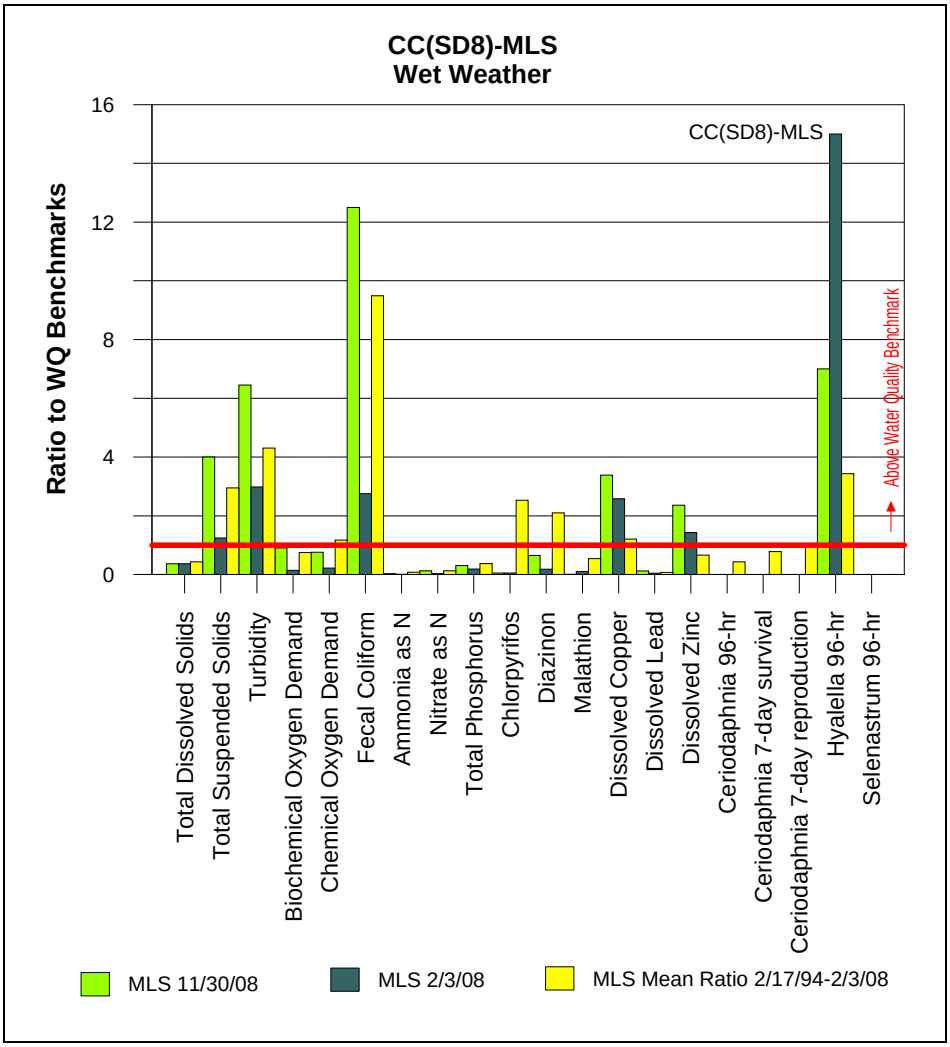

Figure 4. Chollas Creek Wet Weather Water Quality Ratios - SD8(1)

Diazinon and Chlorpyrifos are banned by the USEPA for urban pesticide use. During the 2007–2008 monitoring season Diazinon and Chlorpyrifos were below their respective acute benchmarks. Diazinon was detected at low concentrations during both the November and February monitoring events (0.047 µg/L and 0.013 µg/L, respectively). Chlorpyrifos was not detected. As the residual supply of Diazinon becomes exhausted, detections of this banned pesticide should continue to decrease and as is evident in the monitoring results collected (Figure 5). A shift in pesticide usage from Diazinon to other pesticides has occurred in recent years. These compounds represent an emerging priority water quality problem within San Diego County.

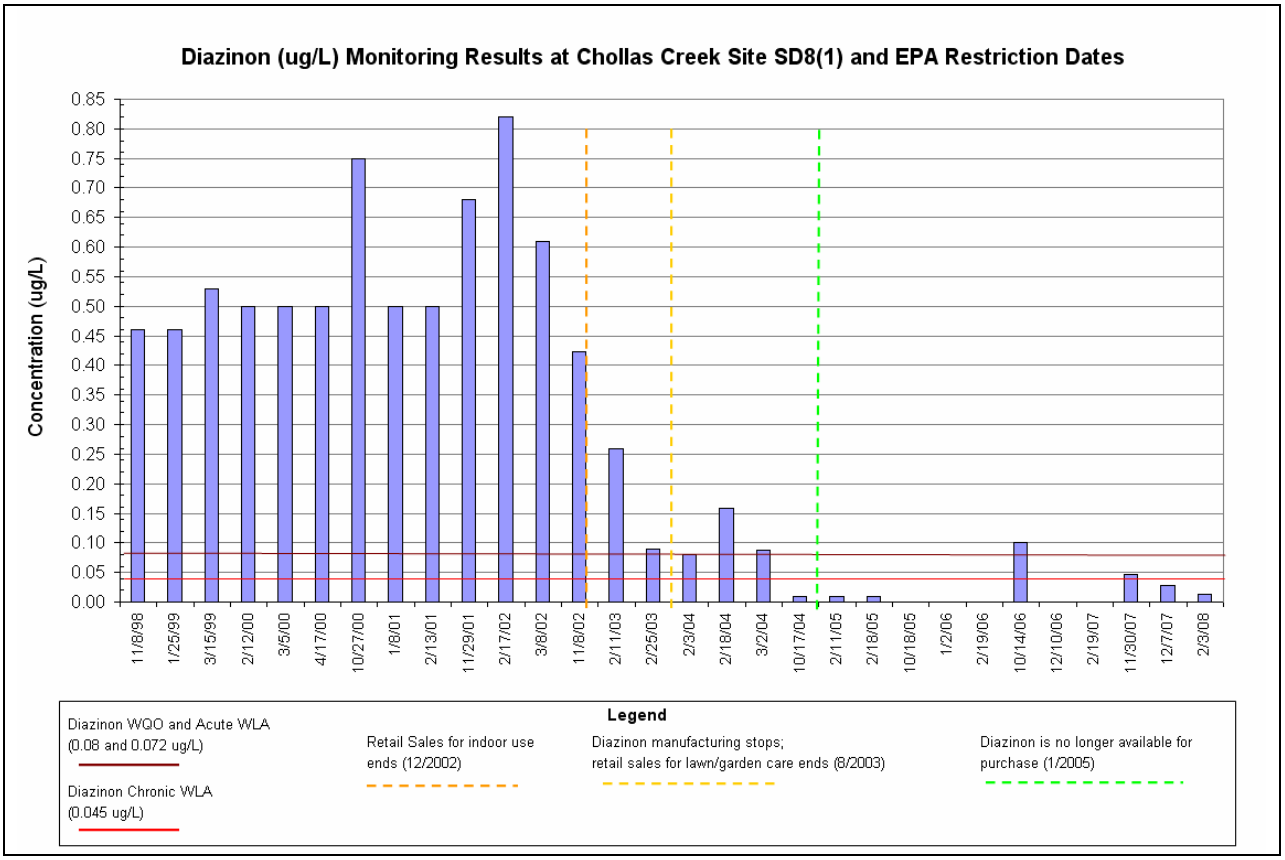

Figure 5. Historical Diazinon Concentrations at Site SD8(1) with Restriction Dates

During the 2007–2008 wet weather monitoring period, MBAS, oil and grease, TSS, and turbidity were above their respective benchmarks. As described in the 2007-2008 San Diego Copermittees Monitoring Report, the October 2007 Harris and Witch Fires which occurred approximately 30 days before the first flush event on November 30, 2008. This fire may have had an ancillary impact on water quality from ash deposition. The Harris Fire occurred in the Dulzura, Otay Valley, and Middle Sweetwater Hydrologic Units, and burnt approximately 49,061 acres within the San Diego Bay Watershed Management Area in which the Chollas Creek Watershed is located. The Witch Fire burned property further north to northeast, but prevailing winds may have deposited ash from this area (Figure 6).

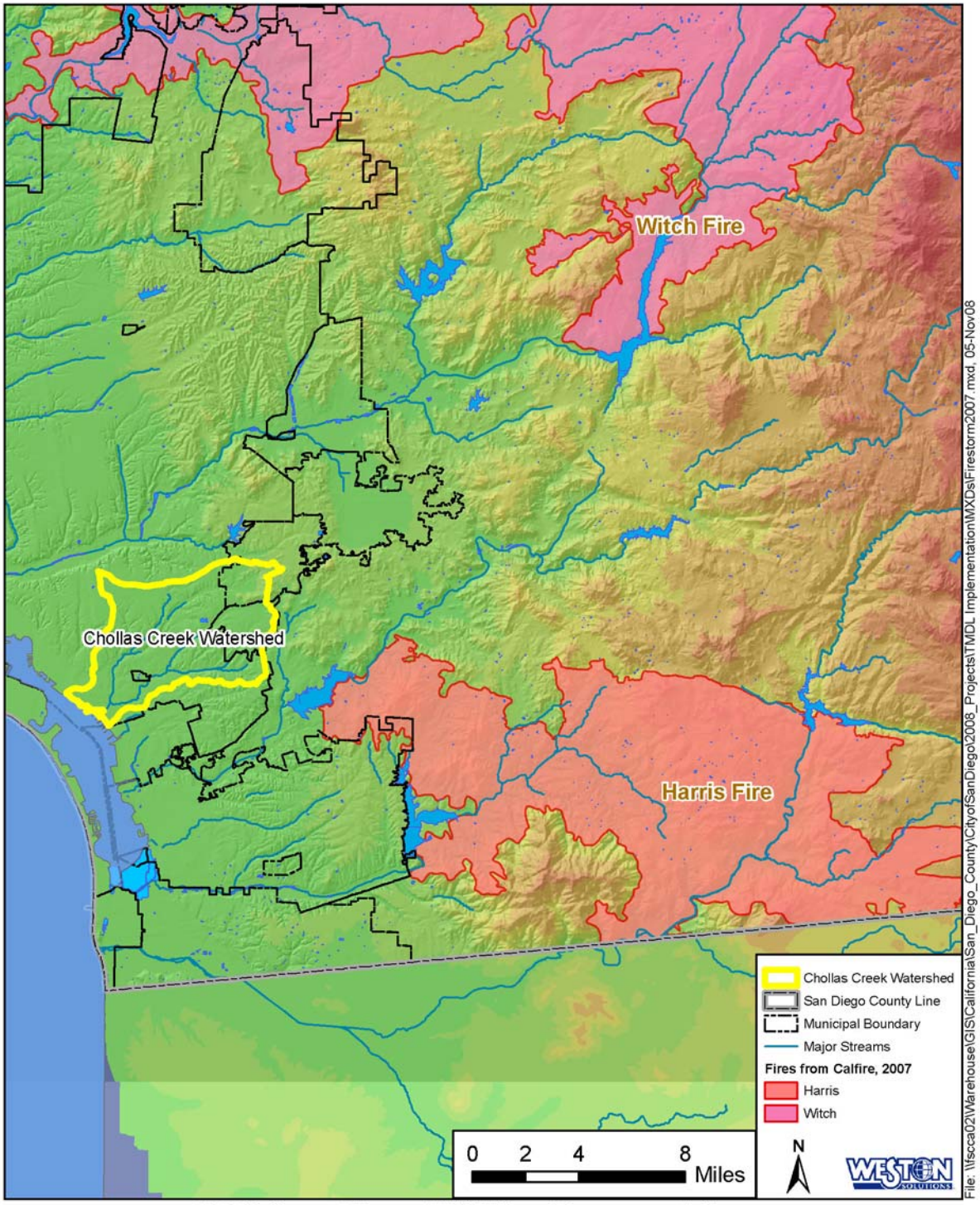

Figure 6. Map of Burn Zone in South San Diego from 2007 Witch and Harris Wildfires

A.5.4 Water Quality Trend Analysis

Statistical trends were evaluated under the San Diego Copermittee Monitoring Program for wet weather at the mass loading station SD8(1) using data from 1994 to 2008. Statistically significant increasing trends were evident for turbidity. Although the 2007-2008 San Diego Copermittee

Monitoring Report did not show any significant trends for dissolved copper or zinc, there is a statistically significant increasing trend for total copper (p=0.028) and total zinc (p=0.006). The trends translate into increased concentrations of total copper (+0.0003 mg/L/yr) and total zinc (+0.003 mg/L/yr). The total metals concentrations in water (copper, lead, and zinc) were highly correlated with suspended sediment. Statistically significant decreasing trends are evident for total lead. At SD8(1) and DPR2, concentrations of Diazinon and Chlorpyrifos have significantly decreased over the last four years of monitoring.

Key Historical and Current Wet Weather Results

- Historical results indicate that the first storm event of the season has higher pollutant concentrations. This was generally confirmed in the 2007-2008 wet weather monitoring season.
- The historical mean data from 1994 to 2008 indicated concentrations exceeding water quality benchmarks for dissolved copper, Chlorpyrifos, Diazinon, bacteria indicators, TSS, turbidity, and toxicity for *Hyalella*.
- Recent results indicate exceedances of the benchmarks for concentrations of dissolved copper and zinc, fecal coliform, TSS, turbidity, and toxicity to *Hyalella*.
- Toxicity identification evaluations conducted as part of the San Diego Copermittee Monitoring Program indicate the causative agent of toxicity at SD8(1) is the synthetic pyrethroid class of compounds.
- Long-term trend analysis at SD8(1) indicated significantly decreasing trends for total lead, nitrate, and toxicity to *H. azteca* and significantly increasing trends for total copper and total zinc.
- Long-term trend analysis at DPR2 indicated concentrations of Chlorpyrifos and Diazinon have significantly decreased over the last four years of monitoring.

A.6 Chollas Creek TMDL Monitoring Study – Jurisdictional Boundary Monitoring 2007-2008

The Chollas Creek TMDL Monitoring Study was implemented to understand jurisdictional and subdrainage contributions to contaminant loading in the Chollas Creek Watershed. Samples were collected at two monitoring locations along the boundary of Lemon Grove and La Mesa and at the two downstream mass loading stations on Chollas Creek (SD8(1) and DPR2). Site LM-1 was located in the drainage area north of SD8(1), the mass loading station located on the north fork of Chollas Creek. Sites LG-1 and DPR2 were located in the south fork of Chollas Creek.

Flow-weighted composite sampling and grab sampling of three storm events were performed at these locations between October 1, 2007 and April 30, 2008. Dry weather flow-weighted composite sampling and grab sampling were conducted during two 24-hour sampling events. Both wet weather and dry weather samples were analyzed for metals, bacteria, organophosphate and organochlorine pesticides, and other constituents. This monitoring data provide baseline "existing conditions" in the Chollas Creek Watershed. A more detailed analysis may be found in the 2007-2008 Chollas TMDL Report (Weston, 2009).

Key Findings of Jurisdictional Boudary Monitoring (2007-2008)

- Dissolved lead concentrations were low across all storm events at all sites in relation to CTR acute criteria.
- During these monitoring events there was not a clear relationship between the upper and lower drainage areas of the Chollas Creek Watershed for dissolved copper and zinc.
- Fecal coliform concentrations were higher than the benchmark (4,000 MPN/100 mL) for all events sampled across all sites and highest for the first flush event.

A.6.1 Aerial Deposition Studies

The City of San Diego has conducted two phases of aerial deposition studies to determine if aerial deposition represents a significant pathway for metals pollutant loading within the watershed. These studies suggests that as a consequence of its highly urbanized location, the Chollas Creek Watershed may receive a significant portion of its total copper and zinc load from aerial deposition. Sources of copper were attributed to primary brake wear from transportation sources and industrial source emissions. Sources of zinc were primarily associated with tire wear and other sources such as galvanized wear debris. Lead was attributed to historical sources of lead such as leaded gasoline and lead based paint. Urbanized areas located predominantly downwind, or adjacent to major transportation corridors have been shown to have higher deposition rates of heavy metals than other, more rural locales. Since 1994, total zinc and total copper concentrations in the Chollas Creek Watershed have shown significant increasing trends.

Key Finding from the Aerial Deposition Studies

- Aerial Deposition of transportation related emissions and industrial emissions may contribute a significant portion of the copper and zinc loads in the Chollas Creek Watershed.
- Wet weather deposition rates are low but may be a contributing factor in wet weather exceedances of dissolved copper and zinc. Additionally, wet weather deposition of copper and zinc may be more influential for Chollas Creek than studies from other regions have indicated.
- Santa Ana winds and wildfires may cause significantly higher deposition rates as a result of ash fallout and higher resuspension rates.

A.6.2 Trash Monitoring

Trash was one of the four priority water quality problems identified in the Dissolved Metals TMDL that will be addressed as part of the integrated multi-pollutant approach over the 20 year TMDL Compliance Schedule. Trash assessments were conducted at the mass loading station SD8(1) during ambient and wet weather monitoring events during the 2007-2008 San Diego Copermittee Monitoring Program in compliance with the Permit (Section II.A.1.k of the Order). Summary results from this trash assessment are presented in Table 2. The trash ratings were typically marginal. This means that at first glance, trash was evident at the location in low to medium levels (approximately 51 to 100 pieces of trash). Further evaluation of the site indicated litter and debris and there was evidence that the site was being frequented by people. In contrast, the "optimal" trash rating means little to no trash was evident on site, at first glance, and during an in depth review, less than 10 pieces were discovered. More information about the types of trash, assessment ratings, source evaluations, and potential routes is provided in Appendix K of the 2007-2008 San Diego Copermittee Monitoring Report.

Table 2. Chollas Creek Trash Assessment Results for Mass Loading Station SD8(1)

Site	Date	Trash Assessment Rating	Threat Rating
SD8(1)	11/30/2007	Marginal	Threat to Human and Aquatic Health[1]
	02/03/2008	Marginal	Threat to Aquatic Health[2]
	03/05/2008	Optimal	None
	06/03/2008	Marginal	Threat to Human and Aquatic Health[3]
[1]Non-specific; trash at the site was characterized as household dumping and upstream littering.			
[2]Non-specific; trash at location includes broken-up couch, plastic chair, Christmas tree stand, and spray paint cans; spray cans are likely toxic and therefore a threat to aquatic health.			
[3]Wire was present on site, which has the potential for physical harm (entanglement). Smaller amounts of trash were also present, which may be ingested.			

APPENDIX A

Discussion of trash assessments will be provided in future versions of the San Diego Copermittee Monitoring Report where inclusion of the dry weather trash assessments will result in a more robust data set that can be used to assess trash on a watershed scale.

The City of San Diego has also implemented a trash assessment program for the Chollas Creek Watershed based on the 13267 Enforcement Letter for Trash. No data from this program was available at the time of writing of this Implementation Plan.